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NOTES ON GEOGRAPHIC DISTRIBUTION

The occurrence of *Carterina spiculotesta* (Carter, 1877) on an artificial substrate

Altair J. Machado * and Facelucia Barros

Universidade Federal da Bahia, Instituto de Geociências, Curso de Pós-Graduação em Geologia, Rua Barão de Jeremoabo s/n, Campus de Ondina, 40170-115, Salvador, Bahia, Brazil
* Corresponding author. E-mail: *altair@ufba*

ABSTRACT: *Carterina spiculotesta* is an extant foraminifera species that makes a calcareous test with secreted spicules embedded into its wall. Modern populations are reported from few regions in Brazil, but this is the first report of living *C. spiculotesta* found on an artificial substrate, which is located near industrial outfalls.

Carterina spiculotesta (Carter, 1877) is the only known species of the order Carterinidae (Loeblich and Tappan 1981). It has a very delicate test, but well-developed molds of their calcareous spicules have been found in the fossil record, including those from the late Cretaceous offshore basins of northeastern Brazil (Lana and Sen Gupta 2001). Modern populations have been reported in sediments from Cabo Frio in Rio de Janeiro (Narchi 1963), and in sediments from the coast of the state of Pernambuco (Boltovskoy and Lena 1966). A single specimen was found in sediments from the northern coast of the state of Bahia (Machado *et al*. 2006).

This paper describes, for the first time, the occurrence of living specimens of *Carterina spiculotesta* encrusted on an artificial substrate, aluminum plates, used for a monitoring program to assess the impact of domestic and industrial outfalls.

The area studied is located on the northern coast of the state of Bahia, in eastern Brazil (12°43' S – 38°02' W and 12°52' S – 38°12' W) (Figure 1). It is characterized by the presence of sand bars, rocky beaches and coralgal reefs (Nolasco and Leão 1986). Ten monitoring stations were placed on concrete structures that held aluminum plates at a depth of approximately 1 m from the ocean bottom. Four stations were located around the mouth of each of two outfalls, and two stations (stations I and II) were considered reference sites (Figure 1). The plates were collected every three months for identification of the encrusted benthic community throughout the years of 1997 and 1998. The frequency of each taxon was calculated with a point count using a 20 cm × 20 cm square grid. The specimens were visually identified with the aid of photographs and comparisons with previous works from Barker (1960), Narchi (1963), Bermudez and Siegle (1963), Boltovskoy and Lena (1966).

The living specimens identified as *C. spiculotesta* had a trocospiral test, lobulated with a rounded periphery and a dark brown color in the first chambers, which changed gradually to light brown until appearing completely white in the last hyaline chambers (Figure 2). The calcareous spicules embedded in their walls were more conspicuous in the hyaline white chambers.

Specimens of *C. spiculotesta* were identified on plates from six of the ten stations (stations I, II, III, IV, V, VI, X), which included stations located near the outfalls of organic compounds (Figure 1). Of a total of 117 specimens identified, 46% were found in direct contact with the aluminum plates and 54% were settled in bryozoan colonies. Seventy-four specimens were living on the sciaphilic side of the plates (63%), while forty-three were on the photophilic side (37%) (Table 1). The highest frequencies of *C. spiculotesta* were found at stations II (22 specimens) and III (81 specimens); the latter was the station closest to the organic compound outfall. The bryozoan species identified that were encrusted with *C. spiculotesta* were as follows: *Parasmittina trispinosa* (38%), *Celleporaria shubarti* (8%), *Membranipora tuberculata* (4.7%), *Rhyncozoon rostrum* (1.6%) and *Biflustra savartii* (1.6%). In addition to the bryozoan colonies, other benthic organisms found encrusting the aluminum plates included vermetid gastropods, cirripeds, ascidians and cnidarians.

These findings suggest that *Carterina spiculotesta* prefers shadow habitats, can encrust bryozoan colonies, and is somewhat resistant to pollution from organic chemical compounds.

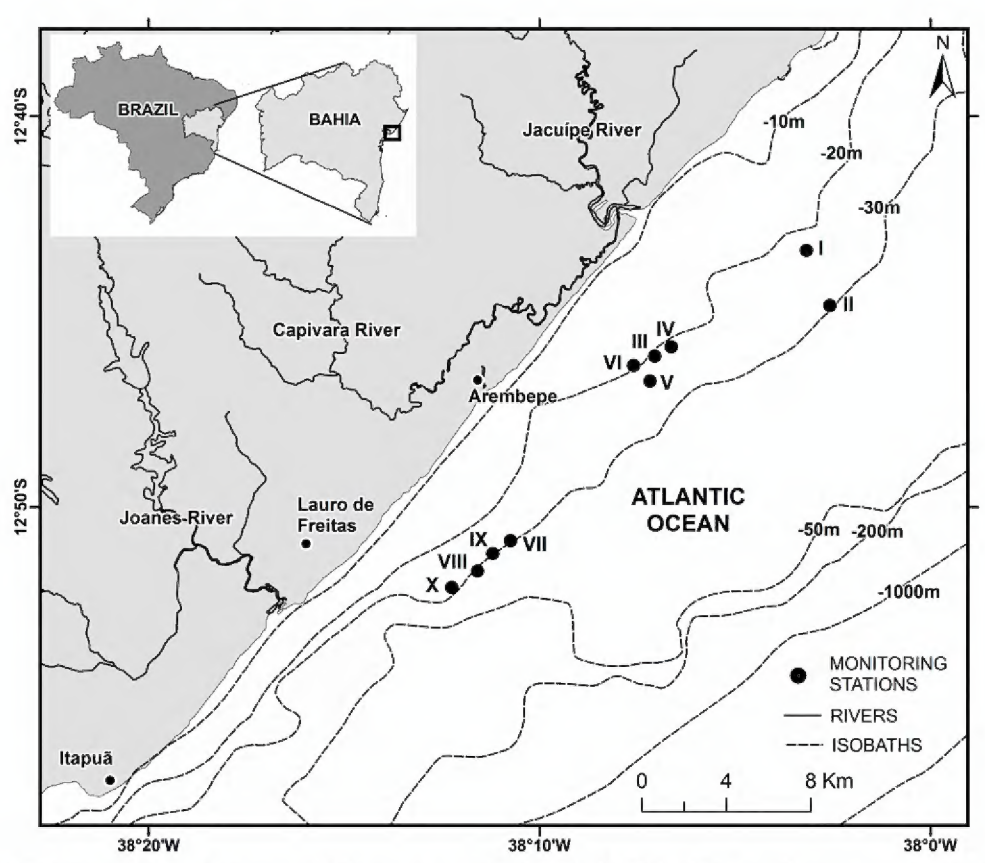

FIGURE 1. Location of the area studied, highlighting the monitoring stations.

Table 1. Number of living specimens of *Carterina spiculotesta* settled on artificial substrata recorded in the years of 1997 and 1998.

STATIONS	ALUMINUM PLATE	BRYOZOAN COLONY	SCIAPHILIC SIDE	PHOTOPHILIC SIDE	TOTAL
I (Reference)	2	1	3	0	**3**
II (Reference)	22	0	20	2	**22**
III	21	60	42	39	**81**
V	1	0	1	0	**1**
VI	4	0	4	0	**4**
X	4	2	4	2	**6**
Total	**54**	**63**	**74**	**43**	**117**

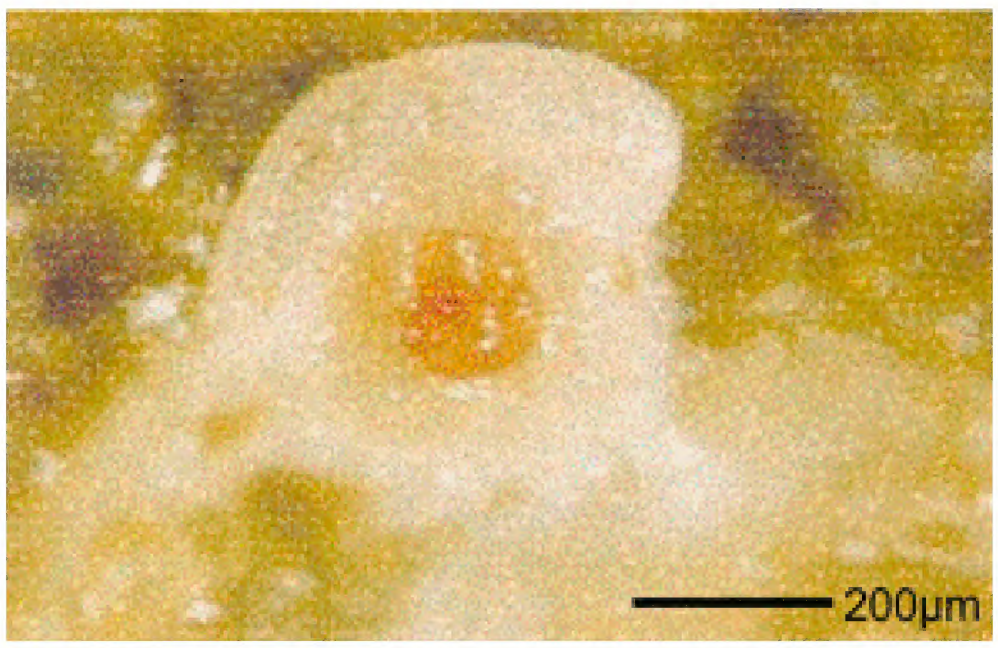

Figure 2. Living specimen of *Carterina spiculotesta* on the aluminum plate. The first chambers are dark brown, changing gradually to light brown until the last chamber is completely white. Photomicrograph was taken in a binocular microscope ZEISS Stemi SV6.

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